

## CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Division.

The following summaries relating to the general weather and crop conditions during February are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon reports from cooperative observers and crop correspondents, of whom there are about 3300 and 14,000, respectively:

**Alabama.**—First two decades wet, quite cold and unfavorable; considerable snow and sleet over northern and western counties; cold wave of 13th to 17th broke previous low temperature records in northern counties; considerable wheat and oats winter-killed. Last week dry and comparatively warm. Farm work behind, but being resumed at close of month, when some gardens were planted; little spring oats sown; fruit trees mostly dormant and apparently uninjured by extreme cold.—*F. P. Chaffee.*

**Arizona.**—A month of cloudiness; frequent and phenomenally heavy precipitation—the most general over the Territory since organization of Climate and Crop Service—some stations recording 10 to 13 inches in southern, and 20 to 40 inches of snowfall in northern, sections; resultant floods damaging railroads, bridges, and canal dams and retarding mining operations. Rapid growth in wheat and barley, which were beginning to head. Crops two to four weeks advanced in southern, one to two weeks behind in northern section, owing to late snow. Stock and ranges in splendid condition. Water supply abundant. Agricultural prospects most promising.—*L. N. Jesunofsky.*

**Arkansas.**—The first three weeks of the month were extremely cold, with much more than the usual amount of snow and ice on the ground; the last week the temperature was seasonable, with little or no precipitation. Fall grains were injured somewhat by severe weather. No plowing was done. Unsheltered stock suffered considerably and some losses were sustained. Peach buds were injured generally in the northern portion of the State; other fruit trees were not injured materially.—*Edward B. Richards.*

**California.**—Both temperature and rainfall were above normal. The most severe frosts of the season occurred on the 12th and 13th, but caused no material damage to early deciduous fruits or oranges. Heavy rains slightly damaged crops in some sections, but were of inestimable value in the San Joaquin Valley and southern California, where the water supply was better than for several years. All crops were in splendid condition.—*Alexander J. McAdie.*

**Colorado.**—Over the eastern half of the State grazing was temporarily interrupted on account of the depth of snow. The condition of live stock varied from good in north-central portion to fair in eastern and southern parts of the State; winter feeding was carried on to some extent; in the western half of the State grazing was prevented on account of snow; live stock suffered from cold spells, but with no very serious results, as a rule; winter feeding was general.—*F. H. Brandenburg.*

**Florida.**—The month was drier and colder than the average; work progressed very well, although somewhat delayed by cold weather during the first half of the month. The absence of sufficient rain over central and southern districts was unfavorable for vegetables and citrus trees. Fall planted oats advanced, and a goodly acreage in central and southern districts was planted to corn. The severe cold wave on the 14th and 15th in west portion of the State was not seriously felt over eastern Florida.—*A. J. Mitchell.*

**Georgia.**—The month was cold and wet with severe freezes; from the 4th to the 8th occurred a severe storm of sleet, snow, and frozen rain which collected in large amounts on trees and caused much damage by breaking of branches over northern half of the State. Grains were seriously damaged, late sown oats having been killed in most sections. Many peach buds killed, especially Elbertas, in northern and middle sections, but enough uninjured buds remained for good yield; little damage in southern portion and fruit outlook excellent. Land was in fine condition. No farm work done.—*J. B. Marbury.*

**Idaho.**—Low temperatures prevailed early in the month; a severe cold wave was experienced in northern counties on the 11th, extending to other portions of the State by the 12th; zero temperatures were recorded at nearly all stations. The latter part of the month was exceptionally warm and bright. Snowfall in the mountains was unusually light and shortage of water was feared. Winter wheat, hay crops, and fruit were not seriously harmed by the cold wave; buds were swelling. Stock was thriving.—*Edward L. Wells.*

**Illinois.**—At the end of the month a considerable portion of wheat was covered with snow, ice, or water, and the condition of the plant was more or less conjectural. In some localities where it was uncovered the plant looked well, but many opinions were advanced that injury would be shown when a general thaw ensued. Fruit suffered from cold, especially peaches. Unfavorable reports were received from all sections. Most correspondents stated that peach buds had been killed, and others that they had probably been seriously damaged.—*Wm. G. Burns.*

**Indiana.**—Abnormally low temperatures prevailed until the 18th, three

cold waves—two of them of marked severity—having passed over the State. Grave apprehension was felt regarding the effect of the intensely cold weather upon wheat, but as the ground was covered with snow or ice its condition could only be conjectured at any time during the month, except that during the last week the snow was rapidly disappearing in the south section and where uncovered fall sown crops seemed not to have suffered materially.—*W. T. Blythe.*

**Iowa.**—First half of February was one of the coldest midwinter periods on record. Latter half much warmer. More than usual snowfall, but much drifted, rendering farm work and care of stock quite difficult. At close of month ground was generally bare, with but little frost remaining in soil. Winter grain and grass were not materially injured; fruit buds apparently safe.—*John R. Sage.*

**Kansas.**—The ground was well covered with snow over the greater portion of the State until the 20th. The snow had all melted before the close of the month. Wheat was much improved by the snow and was generally in good condition. Only a few reports on peaches were received and they indicated that buds were killed. But small loss of stock reported. Ground in fine condition.—*T. B. Jennings.*

**Kentucky.**—Wheat, rye, and grasses reported to have stood cold weather very well, most fields having been protected by snow. Preparations for spring planting progressed. Stock suffered considerably from severe and protracted cold, but recuperated at the end of the month, on account of favorable weather. Fruit probably uninjured. Considerable tobacco still unmarketed at end of the month.—*F. J. Walz.*

**Louisiana.**—Cold, wet, weather during first and second decades proved very unfavorable for agricultural operations, as nothing could be done in the way of preparing the ground for the cotton and corn crops. The month closed more favorable, and plowing was pushed forward as rapidly as possible. Cane planting progressed slowly. The coldest weather since 1899 prevailed during the second decade with minimum temperatures about zero over northern portion of State and between 12° and 20° over southern portion on morning of 14th. Hardy vegetation suffered material damage and tender vegetation, where not protected, was killed. Much vegetation was protected and carried through the cold in good condition on advice of the Weather Bureau warnings.—*I. M. Cline.*

**Maryland and Delaware.**—February was 8° below normal at Baltimore; since 1871 only 1895 was colder. Precipitation was one inch below, and snowfall was normal. Ground was covered with snow the entire month, permitting only routine farm work. Wheat was supposed to be doing well, though some complaint of killed blades came from northeastern portions. Occasional slight damage to fruit trees was reported and some peach buds were killed. Stock was kept in good condition by liberal feeding.—*Oliver L. Fasvig.*

**Michigan.**—Winter wheat and rye were generally well protected by snow throughout the month. A few correspondents who carefully investigated wheat, by digging through the snow, reported a good winter growth. Fruit buds at the close of the month appeared to have wintered well.—*C. F. Schneider.*

**Minnesota.**—Cold weather till the 16th, with minimum temperatures considerably below zero almost daily; on several days early in the month, maximum temperatures were below zero also. Late in the month the temperatures were moderate. Precipitation was all snow. The snow lying on the ground was from three to fifteen inches deep in early and middle parts of month, but it was nearly all gone before the month closed. No work in soil possible.—*T. S. Outram.*

**Mississippi.**—Unusually cold and cloudy weather prevailed during the first three weeks, with heavy snows north and excessive rains east and south. Streams in the southeastern portion of the State overflowed their banks and destroyed or damaged a number of large bridges and drowned some stock. Sleet storms over the southwestern counties were very destructive to telephone lines and forest and fruit trees; many wagon roads were also blocked by fallen trees. Practically no farm work was done, except a little fencing. Oats were badly damaged. Conditions were more favorable the last week, but the ground was generally too wet to plow.—*W. S. Belden.*

**Missouri.**—First and second decades of the month notable for extremely low temperatures and heavy snowfall; ground well covered until the 23d, when thaw set in. Last week was mild and spring-like. Wheat in fair condition. It was estimated that about 90 per cent of peach buds were killed by low temperature of 13th. No farm work done.—*George Reeder.*

**Montana.**—The month was more than usually favorable for stock interests. Cattle and sheep on the ranges suffered during the coldest days, but losses were light. The range was clear and feed plentiful in the eastern counties; hay was fed generally in western counties. Wheat suffered somewhat from lack of snow protection. Considerable plowing was done in southern and western counties during warm days of the last decade.—*R. F. Young.*

**Nebraska.**—The ground was well covered with snow during the first three weeks, furnishing an excellent protection and preventing injury to winter wheat by the severe cold. The snow melted the last week of the

## SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS, FEBRUARY, 1905.

In the following table are given, for the various sections of the Climate and Crop Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and

lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Section.	Temperature—in degrees Fahrenheit.						Precipitation—in inches and hundredths.					
	Section average.	Departure from the normal.	Monthly extremes.				Section average.	Departure from the normal.	Greatest monthly.		Least monthly.	
			Station.	Highest.	Date.	Station.	Lowest.	Date.	Station.	Amount.	Station.	Amount.
Alabama.....	39.2	- 8.0	Lucy.....	77	25	Valley Head.....	-18	14	Spring Hill.....	12.64	Notasulga.....	3.48
Arizona.....	48.9	+ 0.3	{Aztec, Picacho.....	85	26	Flagstaff.....	-18	13	Pinal Ranch.....	13.38	Tuba.....	1.21
Arkansas.....	32.3	- 9.4	Gilabed.....	85	28	Pond.....	-29	13	Elon.....	5.71	2 stations.....	1.00
California.....	50.8	+ 2.1	Texarkana.....	82	28	Bodie.....	-27	12	Cuyamaca.....	15.91	Montague.....	0.83
Colorado.....	22.9	- 4.4	Modesto.....	84	26	Lay.....	-47	12	Durango.....	4.38	San Luis.....	0.04
Florida.....	58.1	- 0.9	Shasta.....	84	25	Milton.....	10	14	De Funiak Springs..	10.32	Marco.....	0.00
Georgia.....	40.6	- 6.2	Trinidad.....	83	23	Tallapoosa.....	- 8	14	Putnam.....	13.44	Atlanta.....	3.12
Idaho.....	25.9	- 7.0	Hypoluxo.....	89	13	Chesterfield.....	-48	12	Priest River.....	2.05	2 stations.....	0.00
Illinois.....	19.0	- 7.0	Plant City.....	89	12	Ashtou.....	-32	13	Morrison.....	2.89	Hillsboro.....	0.86
Indiana.....	20.9	- 7.7	Fleming.....	81	20	Delphi.....	-24	13	Marengo.....	4.18	Auburn.....	0.96
Iowa.....	12.8	- 6.3	Waverly.....	81	20	Galva, Ida Grove.....	-41	2	Belle Plaine.....	2.97	Sioux City.....	0.44
Kansas.....	21.1	- 8.8	Blue Lakes.....	70	28	Lebanon.....	-40	13	Toronto.....	2.42	Jetmore.....	0.10
Kentucky.....	27.9	- 6.7	Plum Hill.....	68	28	Edmonton.....	-16	14	Alpha.....	4.35	Eubank.....	1.57
Louisiana.....	43.4	- 9.0	Glenwood, Onawa.....	69	28	Minden.....	1	14	Clinton.....	13.44	Mansfield.....	2.70
Maryland and Delaware.	25.4	- 6.2	Garden City.....	86	25	Oakland, Md.....	-20	4	Millsboro, Del.....	5.44	Westport, Md.....	0.43
Michigan.....	13.8	- 5.6	Bowling Green.....	67	28	Ewen.....	-40	5	West Branch.....	3.50	Humboldt.....	0.20
Minnesota.....	8.9	- 1.9	Monroe.....	81	27	Pokegama Falls.....	-51	2	Rolling Green.....	2.40	Beaulieu.....	0.06
Mississippi.....	38.5	- 8.9	4 Stations.....	58	25	University.....	-10	14	Magnolia.....	12.82	Holly Springs.....	2.58
Missouri.....	21.5	- 8.6	Iron River.....	53	20	Warsaw.....	-40	13	Princeton.....	3.10	Lamonte.....	0.47
Montana.....	16.9	- 3.3	Bird Island.....	65	27	Grayling.....	- 60	12	Saltese.....	1.70	2 stations.....	0.00
Nebraska.....	15.8	- 6.8	Crystal Springs.....	79	23	Winnebago.....	-45	2	Plattsburgh.....	1.92	Fort Robinson.....	0.02
Nevada.....	37.8	+ 2.4	Natchez.....	79	28	Wells.....	-37	12	Lewers Ranch.....	4.45	Sodaville.....	0.00
New England*.....	17.1	- 7.5	Jackson.....	69	28	Van Buren, Me.....	-32	2	Jacksonville, Vt.....	3.31	Enosburg Falls, Vt.....	0.54
New Jersey.....	23.4	- 7.2	Jackson.....	68	22, 25	River Vale.....	-18	5	Bridgeton.....	3.96	2 stations.....	0.87
New Mexico.....	35.0	- 2.1	Billings.....	68	25	Cimarron.....	-35	12	Alma.....	6.06	Eagle Rock Ranch.....	0.37
New York.....	16.2	- 6.2	Toston.....	68	27	Paul Smiths.....	-32	5	Palermo.....	4.22	Harkness.....	0.24
North Carolina.....	34.2	- 8.6	Alliance.....	74	24	Linnville, Marshall.....	- 8	14	Selma.....	7.80	Marshall.....	2.45
North Dakota.....	8.2	- 1.4	Caliante.....	80	22	Ashley.....	-46	22	Coal Harbor.....	0.81	5 stations.....	T.
Ohio.....	20.8	- 6.5	Framingham, Mass.....	54	21, 22	Dunseith.....	-46	12	Green.....	2.64	Orangeville.....	0.50
Oklahoma and Indian Territories.	28.0	-10.4	Flemington.....	57	21	Millport.....	-22	3	Blackburn, Okla.....	6.00	Enid, Okla.....	0.15
Oregon.....	37.6	+ 0.5	Carlsbad.....	76	24	Cleo, Whiteagle, Okla.....	-25	13	Nebalem.....	7.27	2 stations.....	0.13
Pennsylvania.....	20.8	- 6.7	Otto.....	55	26	Pine.....	-27	12	Lewers Lock.....	2.83	Towanda.....	0.44
Porto Rico.....	73.3	.....	Henrietta.....	69	26	Smithport.....	-24	5	Barros.....	4.46	Juana Diaz.....	T.
South Carolina.....	38.9	- 7.7	Forman.....	64	23	Aibonito.....	-46	23	Blackville.....	8.20	Barksdale.....	2.87
South Dakota.....	12.1	- 2.9	Meeker, Okla.....	78	26	Walhallia.....	0	14	Elk Point.....	1.50	3 stations.....	T.
Tennessee.....	31.3	- 9.2	Fairview.....	80	25	Cavite, Greenwood.....	-48	2	Benton.....	8.65	Wildersville.....	1.25
Texas.....	39.2	-10.0	Uniontown.....	59	12	Carthage.....	-28	14	Orange.....	7.01	Texline.....	0.50
Utah.....	30.5	- 2.1	Central, Aguirre.....	94	25	Claude.....	-16	13	Rauch.....	7.60	Kelton.....	0.02
Virginia.....	28.6	- 7.5	Yemassee.....	72	20	Woodruff.....	-35	12	Blacksburg.....	6.07	McDowell.....	0.17
Washington.....	34.4	- 0.2	Cavite, Greenwood.....	69	28	McDowell.....	-16	14	Clearwater.....	10.30	Horde Heaven.....	0.05
West Virginia.....	25.6	- 6.0	St. George.....	83	26	Cusick.....	-22	10	Logan.....	4.65	Moorefield.....	0.80
Wisconsin.....	10.8	- 5.0	Bedford City.....	63	24	Phillippi.....	-22	3	Sheboygan.....	3.20	New Richmond.....	0.80
Wyoming.....	16.8	- 4.1	Hutton.....	76	24	Hayward.....	-38	3	Green River.....	2.14	Basin.....	T.
			Williamson.....	56	25	Grand Canyon, Soda Butte (Y. N. Park).....	-53	12				
			Hillsboro, Grantsburg (Easton's Ranch.....	51	28							
			{ Wolf P. O. ).....	70	21							

\* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

month, placing the ground in excellent condition. The low temperature and excess of snow were rather unfavorable for stock, but the loss was generally small.—*G. A. Loveland.*

**Nevada.**—Weather mild and pleasant the greater part of the month. Range feed very good. Live stock in excellent condition. Snow in the mountains deficient and prospects for water rather discouraging. Plowing in southern and western sections latter part of the month. Fruit trees and vegetation well advanced in southeastern portion.—*J. H. Smith.*

**New England.**—February was exceptionally cold, but was otherwise a pleasant winter month, there having been many more fair and sunny days than generally experienced at this season. The temperature was uniformly rather than extremely low, February in some other years having given considerably lower minimum records. The weather was generally favorable for the midwinter industries of the section, and the covering of snow and ice on the ground afforded protection for grass and winter grain.—*J. W. Smith.*

**New Jersey.**—Wheat, rye, and grass were well protected by a good blanket of snow. Fruit trees were still dormant; peach and pear trees, in places, were badly infested with San Jose scale; injury to peach buds by severe cold was slight.—*Edward W. McGann.*

**New Mexico.**—Rain or snow fell in abundance and thoroughly saturated the soil, and many streams at the close of the month were at flood tide and all flowing freely, while lakes and water holes were filled. Exceed-

ingly low temperatures occurred over the mountain slopes and mesas of the eastern portion on the 12th and 13th, breaking all previous records and caused some injury to fruit buds. During the latter part of the month warm and favorable weather started grass and alfalfa, and in southern portions fruit trees were beginning to bloom. Range stock was generally in good condition and losses had been few.—*J. B. Sloan.*

**New York.**—The weather conditions during the month were favorable for agricultural and horticultural interests. The temperature was considerably below the normal, but there was no alternate thawing and freezing. Wheat and rye were well protected by snow, and fruit buds were apparently uninjured. Water was reported to be low in many localities, but promised to be replenished by the melting snow. Farm stock came in fairly good condition. Deep snow interfered with travel and delayed work in some sections.—*H. B. Hersey.*

**North Carolina.**—Owing to the continuous cold weather and frequent rains and sleet which characterized the month of February, practically no farm work of any kind was accomplished; no plowing or planting even of truck crops was done. Wheat, oats, and rye remained very backward in growth, hardly showing above ground, but were thought to have secured good root development. Clover was much damaged. Fruit trees showed no signs of blooming. All farm work was behind, especially the planting of early truck crops.—*C. F. von Herrmann.*

**North Dakota.**—The forepart of the month was very cold, and during

that period stock on the ranges suffered considerably. After the 15th much warmer weather prevailed, and the close of the month found all live stock, as a rule, in excellent condition.—*B. H. Bronson.*

*Ohio.*—The temperature during the first two-thirds of the month averaged about 15° below normal, but during the remainder it was about normal. The precipitation also was deficient. The ground was well covered with snow, especially during the coldest portion of the month. Wheat, rye, meadows, and pastures were well protected, although some damage occurred by top freezing. Peach buds were injured somewhat in the south-west. Tobacco shipping was delayed by lack of moisture and warmth.—*J. Warren Smith.*

*Oklahoma and Indian Territories.*—February was marked by the lowest temperatures on record at many points, the monthly mean temperatures ranging from 6° to 13° below the normal. A thick covering of snow protected and benefited wheat and placed it in fair to good condition. Ground was in fine condition for spring work and was thoroughly saturated. Stock was in poor to fair condition and suffered considerable loss during severe cold. Apricots, peaches, pears, and berries were badly winter killed, other fruit in fair condition.—*C. M. Strong.*

*Oregon.*—The coldest weather of the winter occurred during the first half of the month. The latter part was warmer than usual, and there were several periods of warm, sunshiny weather. The precipitation, while deficient in all sections, came at opportune times, and was of great benefit. Wheat, rye, and oats came through the cold weather practically uninjured, and at the close of the month all fall sown grain was unusually promising.—*A. B. Wollaber.*

*Pennsylvania.*—The mean temperature for the month was the lowest in the last eighteen years. The average precipitation was the least since 1901 and was only 56 per cent of the seventeen-year normal. The average snowfall was 9.5 inches as against 6.7 last year. Winter grain was amply protected and was thought to be uninjured.—*T. F. Townseul.*

*Porto Rico.*—The rainfall was light, but generally sufficient to keep crops in good condition, except in the southern division where young canes and pastures were drying up. Sugar making continued throughout the month without interruption, and the grade of juice obtained was good, except in a few places where the wet weather of January prevented the canes from maturing well. Much cane was planted. Considerable cotton was picked; yield good. Coffee trees blossomed well. Tobacco cutting was active and a good crop was being obtained. Pineapples promised a good crop. Pasturage was scarce in places, and cattle were suffering.—*E. C. Thompson.*

*South Carolina.*—The month was cold and wet. The precipitation was largely in the form of mixed snow, sleet, and rain, which froze as it fell, melted slowly, and thoroughly saturated the soil. Freezing damaged oats somewhat, but not wheat nor fruit buds, which remained dormant. Truck planting was seriously delayed and growth of such as was up was checked. Some tobacco seed beds were burnt and seeded. The closing week was mild and pleasant, and plowing and preparations for early planting made good progress.—*J. W. Bauer.*

*South Dakota.*—The forepart of the month was very cold, two stations recording a minimum temperature of -48° on the 2d. Generally favorable conditions for live stock prevailed after the 16th; before that date, however, snow on the ground and severe cold necessitated heavy feeding of sheltered stock and reduced flesh on range stock, but only normal actual losses on the ranges were indicated. Winter rye and the limited acreage of winter wheat were protected by snow during the severe weather and no injury therefrom was reported.—*S. W. Glenn.*

*Tennessee.*—Abnormally low temperature and hard freezing wrought serious damage to winter grains, but in many sections snow protected the young plants. Wheat sown early, especially that which was drilled and fertilized, stood the winter fairly well, but late sown was badly uprooted by the freezes. Winter oats and fall grasses were badly killed. Little or no farm work was done during the month.—*H. C. Bate.*

*Texas.*—Unusually cold and wet weather prevailed during the first two decades, and a cold wave of great severity swept across the State early in the second decade. During the third decade the weather was fair and moderately warm. Farm work was greatly retarded by unfavorable weather, but conditions were more favorable by the end of the month. Winter grains were injured by severe weather, but favorable weather later caused improvement. Soil was well supplied with moisture, but spring seeding was delayed. Severe weather caused some damage to garden truck and some loss of cattle.—*M. E. Blystone.*

*Utah.*—Abnormally high temperatures prevailed, except during the middle of the month when a very severe cold wave occurred. Rain and snow fell during the first decade, the amounts being moderate over the northern portion and heavy to excessive over the middle and southern sections. Winter grain was generally in good condition, though in some few localities somewhat damaged. The range was fine and stock thriving. Some fruit reported winter killed. Considerable plowing and sowing was done.—*R. J. Hyatt.*

*Virginia.*—The periods of cold weather occurring throughout the month were more than ordinarily prolonged, and, while lower absolute temperatures have been recorded in February of other years, notably 1895 to 1899, there was but one with the temperature as low. Fortunately, precipitation came mostly as snow, which remained on the ground and furnished excellent and continuous protection to all fall sown crops.—*Edward A. Evans.*

*Washington.*—Month not generally favorable to crops. Severe freezing 10th to 17th badly injured winter wheat in localities where ground was bare, and injured peach and apricot buds in localities of southeast counties. Warm weather after 20th took snow and frost from ground, except in northern counties, causing winter wheat to grow vigorously. Where wheat came up in the fall and was not injured by frost the stand was good, although the wheat was short. Some fall sown did not germinate, and resowing was necessary.—*G. N. Salisbury.*

*West Virginia.*—Cold weather prevailed during the greater part of the month, and the ground was frozen very deep. The snowfall was generally sufficient to afford protection to wheat and rye, but the prospects for these crops were very poor. Stock looked well and the feed on hand was thought to be sufficient. No plowing or other farm work was done.—*E. C. Vose.*

*Wisconsin.*—Decidedly cold weather prevailed throughout the State during the first half of the month, but as there was an ample covering of snow winter grains and grasses were thoroughly protected and suffered no injury. The temperature conditions were much more moderate during the latter part of the month. The snowfall for the State averaged 11.9 inches, which is about normal.—*W. M. Wilson.*

*Wyoming.*—The first half of the month was unusually cold, culminating on the 12th in one of the most severe cold waves ever experienced in the State. The latter half of the month was very mild and pleasant. Notwithstanding the severe cold weather, stock losses were very light, and were confined to the southeastern counties of the State, where the snowfall was the heaviest and where for a few days stock found it difficult to secure sufficient feed.—*W. S. Palmer.*

## SPECIAL ARTICLES.

### A RELATION BETWEEN AUTUMNAL RAINFALL AND THE YIELD OF WHEAT OF THE FOLLOWING YEAR—PRELIMINARY NOTE.

By W. N. SHAW, Sc.D., F.R.S., Secretary of the Meteorological Council.

[Read before the Royal Society, February 2, 1905.]

By autumn, in this note, is to be understood the period from the thirty-sixth to the forty-eighth week, both inclusive, of the year, as represented in the Weekly Weather Report of the Meteorological Office; it covers the months of September, October, and November, approximately. The rainfall to be referred to is the average amount in inches, for the "principal wheat producing districts," for the period mentioned, in successive years. The amounts are taken from the summaries of the Weekly Weather Report.

The yield of wheat is that given for successive years in the annual summaries of the Board of Agriculture and Fisheries as the average yield in bushels per acre for England since 1884, or more strictly since 1885, as that is the first year for which the figures for England are given separately. In 1884 the figure for Great Britain, which generally differs but little from that for England, is used.

These are the only figures in the official publications which are immediately available for the purposes of comparison. The totals of rainfall for the thirteen weeks have been compiled from the weekly amounts; otherwise the figures are taken as they stand in published returns. The areas referred to are not exactly coterminous, but they are more nearly so than if the rainfall values had been taken for the whole of England, or the wheat yield for Great Britain.

When the autumn rainfall and the yields of wheat for successive years from 1884 to 1904, as thus defined, are plotted, the rainfall curve being inverted, i. e., rainfall being measured downward on the paper while yield is measured upward, there is a very striking similarity between the curves, so much so as to suggest that if the scales were suitably chosen the two curves would superpose and show general consonance, with exceptions, more or less striking, in a few of the years. In other words, the yield of wheat in any year seems to depend mainly on the absence of rainfall in the previous autumn, and but little on any other factor.

The obvious algebraical expression for such a condition as the curves represent is a linear equation, and the equation